Small Business Innovation Research/Small Business Tech Transfer

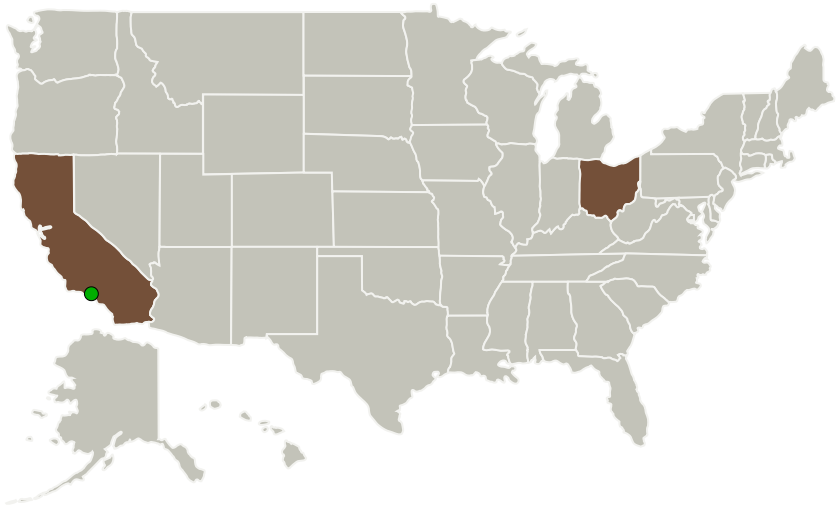
Manufacturing Decision Tree Model Optimization for Finishing Additive Manufactured Components, Phase I

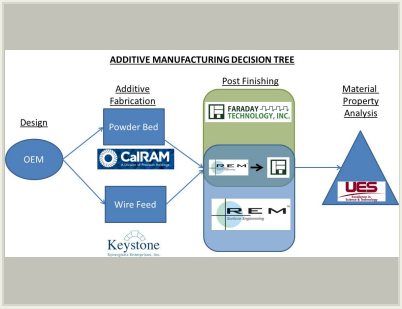
Completed Technology Project (2017 - 2017)

Project Introduction

This Phase I program addresses the challenge of gaining the necessary knowledge needed to support certification of additive manufacturing (AM) hardware and achieving the desired surface finish and mechanical properties on high value components produced by AM. To achieve this goal Faraday Technology Inc., will work with team members at UES Inc., CalRAM Inc., Keystone Synergistic Enterprise Inc., and REM Surface Engineering to develop the necessary empirical knowledge to produce a manufacturing decision tree model (MDTM) that will enable the part designer to reduce the cycle time required produce the desired part with the required surface finish. The MDTM will be designed to select the appropriate build pathway to form the desired component and improve the as-built surface finish on the required areas while also determining the necessary secondary steps to achieve the desired surface finish on all required surfaces. With this teams combined expertise range from AM part building [ARCAM (E-BEAM), SLM (LASER), Wire Fed (E-BEAM)], secondary AM part finishing [electrochemical and isotropic], and post process AM material evaluation (tensile and microstructural characterization) we will be able to diagnose the best manufacturing cycle to reduce time and cost while ensuring the functionality of the produced material is maintained through each processing step. It is envisioned that the outcome of this Phase I/II program would be a working MDTM that has the potential to diagnose the best manufacturing pathway to produce a wide range of high-value components with various shapes and contours.

Primary U.S. Work Locations and Key Partners





Manufacturing Decision Tree Model Optimization for Finishing Additive Manufactured Components, Phase I Briefing Chart Image

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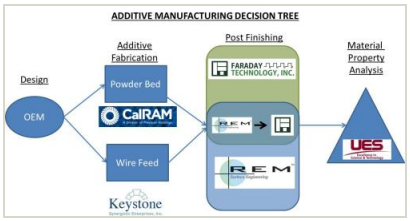
Organizations Performing Work	Role	Type	Location
Faraday Technology, Inc	Lead Organization	Industry	Clayton, Ohio
Jet Propulsion Laboratory(JPL)	Supporting Organization	NASA Center	Pasadena, California

Primary U.S. Work Locations	
California	Ohio

Images



Briefing Chart Image
Manufacturing Decision Tree Model Optimization for Finishing Additive Manufactured Components, Phase I Briefing Chart Image *(https://techport.nasa.gov/image/136342)*

Organizational Responsibility

Responsible Mission Directorate:
Space Technology Mission Directorate (STMD)

Lead Organization:
Faraday Technology, Inc

Responsible Program:
Small Business Innovation Research/Small Business Tech Transfer

Project Management

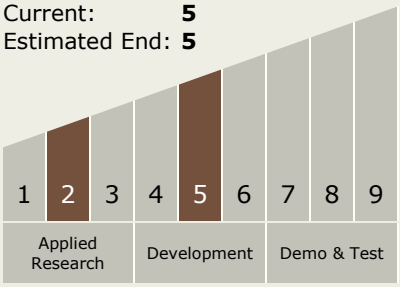
Program Director:
Jason L Kessler

Program Manager:
Carlos Torrez

Principal Investigator:
Timothy D Hall

Technology Maturity (TRL)

Start: **2**
Current: **5**
Estimated End: **5**



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Technology Areas

Primary:

- TX12 Materials, Structures, Mechanical Systems, and Manufacturing
  - TX12.4 Manufacturing
    - TX12.4.1 Manufacturing Processes

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System